AMENDMENTS TO THE CLAIMS

1. (Currently Amended): A method of automatically re-provisioning a network element in adaptation to a failure, the method comprising the computer-implemented steps of:

identifying a network element that has failed;

selecting a substitute network element from among a pool of one or more available network elements;

receiving connection configuration information from the identified network element; and

based on the connection configuration information, re-configuring the substitute network element and one or more switch devices associated with the identified network element, wherein the re-configuring causes the one or more switch devices to change one or more connections from the identified network element to the substitute network element.

2. (Currently Amended): [[A]] The method as recited in Claim 1, wherein the identified network element is one of a plurality of network elements in a cluster that is associated with first and second network switches.

3. (Currently Amended): [[A]] The method as recited in Claim 1, wherein the steps are performed by a cluster manager that is communicatively coupled to a cluster comprising a plurality of active network elements, the pool of one or more available network elements, a first network switch, and a second network switch.

4. (Currently Amended): [[A]] The method as recited in Claim 1, wherein the step of re-configuring comprises the steps of sending a trigger event to the substitute network element that causes the substitute network element to retrieve a configuration over a network connection.

5. (Currently Amended): [[A]] The method as recited in Claim 1, wherein re-configuring comprises dynamically reconfiguring the selected network element as a logical clone of the identified network element.

6. (Currently Amended): [[A]] The method as recited in Claim 1, further comprising the step of associating the identified network element with the pool of available network elements.

7. (Currently Amended): [[A]] The method as recited in Claim 1, further comprising the steps of:

sending an initial configuration to the substitute network element;

sending a partial accumulated configuration to the substitute network element; and

sending instructions that cause the identified network element to reboot based on a configuration setting of a cluster associated with the identified network element.

8. (Currently Amended): [[A]] The method as recited in Claim 1, further comprising the steps of:

receiving first user input in a graphical user interface that associates the network elements in a cluster with a first switch and a second switch;

receiving second user input that specifies which network elements are reserved in the pool of available network elements.

9. (Currently Amended): [[A]] The method as recited in Claim 1, wherein each of the network elements is a network aggregation device or a network access server.

10. (Currently Amended): [[A]] The method as recited in Claim 1, further comprising repeating the steps for multiple concurrently failed network elements.

11. (Currently Amended): [[A]] The method as recited in Claim 1, further comprising the steps of:

receiving a message specifying a failure of a network element over an event bus on which the network elements publish events and on which a cluster manager subscribes to events;

based on the message, identifying the network element that has failed.

12. (Currently Amended): [[A]] The method as recited in Claim 1, wherein the network switches are asynchronous transfer mode (ATM) switches, and wherein the network elements are routers in a packet-switched network.

13. (Currently Amended): A method of automatically re-provisioning a network element in adaptation to a failure, the method comprising the computer-implemented steps of:

receiving first user input that defines a cluster comprising a first network switch, a plurality of network elements, and a second network switch;

receiving second user input that specifies one or more of the network elements as a pool of available network elements;

identifying a network element that has failed;

selecting a substitute network element from among the pool; and

re-configuring the first network switch and the second network switch, wherein the re-configuring causes the first network switch and second network switch to change one or more connections from the identified network element to the substitute network element.

14. (Currently Amended): [[A]] The method as recited in Claim 13, wherein the step of re-configuring comprises the steps of sending a trigger event to the substitute network

element that causes the substitute network element to retrieve a configuration over a network connection.

15. (Currently Amended): [[A]] The method as recited in Claim 13, wherein re-configuring comprises dynamically reconfiguring the selected network element as a logical clone of the identified network element.

16. (Currently Amended): [[A]] The method as recited in Claim 13, further comprising the step of associating the identified network element with the pool of available network elements.

17. (Currently Amended): [[A]] The method as recited in Claim 13, further comprising the steps of:

sending an initial configuration to the substitute network element;

sending a partial accumulated configuration to the substitute network element; and

sending instructions that cause the identified network element to reboot based on a configuration setting of a cluster associated with the identified network element.

18. (Currently Amended): [[A]] The method as recited in Claim 13, wherein each of the network elements is a network aggregation device or a network access server.

19. (Currently Amended): [[A]] The method as recited in Claim 13, further comprising repeating the steps for multiple concurrently failed network elements.

20. (Currently Amended): [[A]] The method as recited in Claim 13, further comprising the steps of:

receiving a message specifying a failure of a network element over an event bus on which the network elements publish events and on which a cluster manager subscribes to events;

based on the message, identifying the network element that has failed.

21. (Currently Amended): [[A]] The method as recited in Claim 13, wherein the network switches are asynchronous transfer mode (ATM) switches, and wherein the network elements are routers in a packet-switched network.

22. (Currently Amended): A computer-readable medium ~~carrying~~ storing one or more sequences of instructions for automatically re-provisioning a network element in adaptation to a failure, which instructions, when executed by one or more processors, cause the one or more processors to carry out the steps of:

identifying a network element that has failed;

selecting a substitute network element from among a pool of one or more available network elements;

receiving connection configuration information from the identified network element; and

based on the connection configuration information, re-configuring the substitute network element and one or more switch devices associated with the identified network element, wherein the re-configuring causes the one or more switch devices to change one or more connections from the identified network element to the substitute network element.

23. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, wherein the identified network element is one of a plurality of network elements in a cluster that is associated with first and second network switches.

24. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, wherein the instructions are executed by a cluster manager that is communicatively coupled to a cluster comprising a plurality of active network elements, the pool of one

or more available network elements, a first network switch, and a second network switch.

25. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, wherein the instructions for re-configuring further comprise instructions for sending a trigger event to the substitute network element that causes the substitute network element to retrieve a configuration over a network connection.

26. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, wherein the instructions for re-configuring further comprise instructions for dynamically reconfiguring the selected network element as a logical clone of the identified network element.

27. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, further comprising instructions for associating the identified network element with the pool of available network elements.

28. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, further comprising instructions for:

sending an initial configuration to the substitute network element;

sending a partial accumulated configuration to the substitute network element; and

sending instructions that cause the identified network element to reboot based on a configuration setting of a cluster associated with the identified network element.

29. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, further comprising instructions for:

receiving first user input in a graphical user interface that associates the network elements in a cluster with a first switch and a second switch;

receiving second user input that specifies which network elements are reserved in the pool of available network elements.

30. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, wherein each of the network elements is a network aggregation device or a network access server.

31. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, further comprising instructions for repeatedly executing the instructions for multiple concurrently failed network elements.

32. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, further comprising instructions for performing the steps of:

receiving a message specifying a failure of a network element over an event bus on which the network elements publish events and on which a cluster manager subscribes to events;

based on the message, identifying the network element that has failed.

33. (Currently Amended): [[A]] The computer-readable medium as recited in Claim 22, wherein the network switches are asynchronous transfer mode (ATM) switches, and wherein the network elements are routers in a packet-switched network.

34. (Currently Amended): An apparatus for automatically re-provisioning a network element in adaptation to a failure, comprising:

means for identifying a network element that has failed;

means for selecting a substitute network element from among a pool of one or more available network elements;

means for receiving connection configuration information from the identified network element; and

means for re-configuring the substitute network element and one or more switch devices associated with the identified network element, based on the connection configuration information, wherein the re-configuring causes the one or more switch devices to change one or more connections from the identified network element to the substitute network element.

35. (Currently Amended): [[An]] The apparatus as recited in Claim 34, wherein the identified network element is one of a plurality of network elements in a cluster that is associated with first and second network switches.

36. (Currently Amended): [[An]] The apparatus as recited in Claim 34, wherein the apparatus comprises a cluster manager that is communicatively coupled to a cluster comprising a plurality of active network elements, the pool of one or more available network elements, a first network switch, and a second network switch.

37. (Currently Amended): [[An]] The apparatus as recited in Claim 34, wherein the re-configuring means comprises means for sending a trigger event to the substitute network element that causes the substitute network element to retrieve a configuration over a network connection.

38. (Currently Amended): [[An]] The apparatus as recited in Claim 34, wherein the re-configuring means comprises means for dynamically reconfiguring the selected network element as a logical clone of the identified network element.

39. (Currently Amended): [[An]] The apparatus as recited in Claim 34, further comprising means for associating the identified network element with the pool of available network elements.

40. (Currently Amended): [[An]] The apparatus as recited in Claim 34, further comprising:

means for sending an initial configuration to the substitute network element;

means for sending a partial accumulated configuration to the substitute network element; and

means for sending instructions that cause the identified network element to reboot based on a configuration setting of a cluster associated with the identified network element.

41. (Currently Amended): [[An]] The apparatus as recited in Claim 34, further comprising:

means for receiving first user input in a graphical user interface that associates the network elements in a cluster with a first switch and a second switch;

means for receiving second user input that specifies which network elements are reserved in the pool of available network elements.

42. (Currently Amended): [[An]] The apparatus as recited in Claim 34, wherein each of the network elements is a network aggregation device or a network access server.

43. (Currently Amended): [[An]] The apparatus as recited in Claim 34, further comprising means for using the other means repeatedly for multiple concurrently failed network elements.

44. (Currently Amended): [[An]] The apparatus as recited in Claim 34, further comprising:

means for receiving a message specifying a failure of a network element over an event bus on which the network elements publish events and on which a cluster manager subscribes to events;

means for identifying the network element that has failed, based on the message.

45. (Currently Amended): [[An]] The apparatus as recited in Claim 34, wherein the network switches are asynchronous transfer mode (ATM) switches, and wherein the network elements are routers in a packet-switched network.

46. (Currently Amended): An apparatus for automatically re-provisioning a network element in adaptation to a failure, comprising:

a network interface that is coupled to the data network for receiving one or more packet flows therefrom;

a processor;

one or more stored sequences of instructions which, when executed by the processor, cause the processor to carry out the steps of:

identifying a network element that has failed;

selecting a substitute network element from among a pool of one or more available network elements;

receiving connection configuration information from the identified network element; and

based on the connection configuration information, re-configuring the substitute network element and one or more switch devices associated with the identified network element, wherein the re-configuring causes the one or more switch devices to change one or more connections from the identified network element to the substitute network element.

47. (Currently Amended): [[An]] The apparatus as recited in Claim 46, wherein the identified network element is one of a plurality of network elements in a cluster that is associated with first and second network switches.

48. (Currently Amended): [[An]] The apparatus as recited in Claim 46, wherein the steps are performed by a cluster manager that is communicatively coupled to a cluster comprising a plurality of active network elements, the pool of one or more available network elements, a first network switch, and a second network switch.

49. (Currently Amended): [[An]] The apparatus as recited in Claim 46, wherein the step of re-configuring comprises the steps of sending a trigger event to the substitute network element that causes the substitute network element to retrieve a configuration over a network connection.

50. (Currently Amended): [[An]] The apparatus as recited in Claim 46, wherein re-configuring comprises dynamically reconfiguring the selected network element as a logical clone of the identified network element.

51. (Currently Amended): [[An]] The apparatus as recited in Claim 46, further comprising the step of associating the identified network element with the pool of available network elements.

52. (Currently Amended): [[An]] The apparatus as recited in Claim 46, further comprising the steps of:

sending an initial configuration to the substitute network element;

sending a partial accumulated configuration to the substitute network element; and

sending instructions that cause the identified network element to reboot based on a configuration setting of a cluster associated with the identified network element.

53. (Currently Amended): [[An]] The apparatus as recited in Claim 46, further comprising the steps of:

receiving first user input in a graphical user interface that associates the network elements in a cluster with a first switch and a second switch;

receiving second user input that specifies which network elements are reserved in the pool of available network elements.

54. (Currently Amended): [[An]] The apparatus as recited in Claim 46, wherein each of the network elements is a network aggregation device or a network access server.

55. (Currently Amended): [[An]] The apparatus as recited in Claim 46, further comprising repeating the steps for multiple concurrently failed network elements.

56. (Currently Amended): [[An]] The apparatus as recited in Claim 46, further comprising the steps of:

receiving a message specifying a failure of a network element over an event bus on which the network elements publish events and on which a cluster manager subscribes to events;

based on the message, identifying the network element that has failed.

57. (Currently Amended): [[An]] The apparatus as recited in Claim 46, wherein the network switches are asynchronous transfer mode (ATM) switches, and wherein the network elements are routers in a packet-switched network.